

wherein said susceptor has a plurality of depressions formed in a lower surface thereof;

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wherein said support shaft has a main shaft positioned coaxial with a center of said susceptor, and a plurality of arms radially extending from an upper end of said main shaft, each of said arms having a distal end provided with a protrusion extending upward, said protrusions correspondingly engaged in the associated depressions such that said protrusions can slide along said depressions only in a substantially radial direction of said susceptor, and

wherein said susceptor is supported only by said protrusions provided on said distal end of each of said arms.

C4 sub 7  
16. A semiconductor production apparatus according to claim 15, wherein said protrusions are engaged in said depressions on the outermost peripheral side thereof, respectively, at ambient temperature.

### REMARKS

The Examiner presented the following rejections:

- (1) Claims 1-4, 7 and 9-20 were rejected under 35 U.S.C. § 102(e) as being anticipated by **Goodman** (2002/0043337).
- (2) Claims 1-4, 7 and 9-20 were rejected under 35 U.S.C. § 103(a) as being obvious over **Goodman**.
- (3) Claims 5 and 6 were rejected under 35 U.S.C. § 103(a) as being obvious over **Goodman** in view of **Nulman** (U.S. Pat. No. 5,098,198).

- (4) Claim 8 was rejected under 35 U.S.C. § 103(a) as being obvious over **Goodman** in view of **deBoer** (U.S. Pat. No. 5,427,620).
- (5) Claim 16 was rejected under 35 U.S.C. § 103(a) as being obvious over **Goodman**.
- (6) Claims 14, 15, 17, 18 and 20 were rejected under 35 U.S.C. § 102(b) as being anticipated by **Perlov** (U.S. Pat. No. 5,421,893).
- (7) Claims 14, 15, 17, 18 and 20 were rejected under 35 U.S.C. § 103(a) as being obvious over **Perlov**.
- (8) Claim 16 was rejected under 35 U.S.C. § 103(a) as being obvious over **Perlov** in view of **Goodman**.
- (9) Claim 19 was rejected under 35 U.S.C. § 103(a) as being obvious over **Perlov**.
- (10) Claims 1-20 were rejected under 35 U.S.C. § 112, second paragraph.

All *but* numbered rejections (6), (7), (9) and (10) are based on **Goodman**. The effective date of the **Goodman** reference is November 2, 1998, by virtue of **Goodman's** parent filing on November 2, 1998 to which **Goodman** was a divisional application.

**GOODMAN IS NOT PRIOR ART**

The effective date of **Goodman** is later than the priority date of the present application, arising from application JP 297087/1998 filed in Japan on October 19, 1998, for which priority was claimed under 35 U.S.C. § 119. Accordingly, Applicants are filing with this response an English translation of the priority document (JP 297087/1998), on which a

claim to priority was made under 35 U.S.C. § 119, together with an accompanying statement or certification, as provided for by 37 C.F.R. § 1.55 and MPEP § 201.15. A certified copy of the priority document was already filed with the international (PCT) application and filing with the U.S. Patent and Trademark Office is not necessary. It is noted that Papers No. 5 and 8 do not acknowledge receipt of the certified copies of the priority document. Confirmation of receipt of the certified copies of the priority documents from the International Bureau is requested (see, e.g., MPEP § 1828).

The submission of the translation is not an admission that the reference applied by the Examiner is substantively sufficient to support the Examiner's rejection. Applicants do not waive any right to take alternative action appropriate to remove the subject matter of the reference in the future.

In view of the antedating of **Goodman**, the various 35 U.S.C. § 102 and 103 rejections advanced by the Examiner, whether over **Goodman** or another reference or references in combination with **Goodman**, are traversed and, indeed, rendered moot. Accordingly, withdrawal of rejections (1) - (5) and (8) above is solicited.

**THE 35 U.S.C. § 112 REJECTION**

Claims 1-20 were rejected under 35 U.S.C. § 112, second paragraph.

The aspects of the rejection advanced by the Examiner with respect to claims 3 and 16 are submitted to be overcome by the amendments to claims 3 and 16, respectively.

Claim 1 has also been amended to remove the term "bottom" from the description of the depressions, as indicated.

The Examiner, referencing Paper No. 5, asserted the terms “depressions” and “depression” were “non-idiomatic, vague and indefinite because a depression is defined as having a central part lower than the margin”. The Examiner again contends that “depressions” or “depression” do not describe elements 32 of Applicant’s Figs. 5-7.

Applicants again traverse this aspect of the rejection. Definiteness of claim language must be analyzed in light of the content of the application disclosure, the teachings of the prior art, and the claim interpretation that would be given by one of ordinary skill in the art at the time the invention was made.

The essential inquiry is whether the claims set out and circumscribe a particular subject matter with a *reasonable* degree of clarity. Whether more suitable language or modes of expression are available in not the requisite test. The issue is legal - not grammatical. Applicants disclosure sets forth, in detail, the concept underlying the claimed depressions, describing and illustrated as one example depressions 32 “formed in the lower surface of the susceptor 22 at the position where the upper end of each protrusion 30 abuts in order to receive the protrusion 30 and limit the movement of the susceptor support shaft 24.” (page 10, lines 10-15). The specification continues to state that “though it is not particularly necessary to specify the depth of the depression 32 since it will be sufficient if the depression 32 can limit the horizontal movement of the susceptor 22, the depth is preferably about half the thickness of the susceptor 22 as shown in Fig. 7 in order to securely prevent the protrusion from separating out of the depression 32.” (page 10, lines 15-23). Thus, particularly in view of the functional description of the depression, those skilled in the art would understand the claimed depressions to comprise

a depression of any shape or size sufficient to receive the protrusion and limit the movement of the susceptor support shaft.

Contrary to the Examiner's assertion that "depression" has one fixed shape or meaning, the claimed depression may comprise any shape or manner of depression. The Examiner's contention that "a depression is defined as having a central part lower than the margin" is simply incorrect. As with many words, there are a variety of conventional definitions for "a depression". In various dictionaries, "a depression" is defined (in one aspect) as "a hollow", which is defined (in one aspect) as "a cavity" or "an unfilled space" (see, e.g., Merriam-Webster's Collegiate Dictionary, 2002 ed.).

Accordingly, it is submitted that all of the claims comport with the requirements of 35 U.S.C. § 112, second paragraph. Withdrawal of this rejection is requested.

**THE 35 U.S.C. § 102 REJECTION OVER PERLOV**

Claims 14, 15, 17, 18 and 20 were rejected under 35 U.S.C. § 102(b) as being anticipated by Perlov (U.S. Pat. No. 5,421,893).

Claim 14 is directed to a semiconductor production apparatus comprising a processing chamber, a susceptor disposed within the processing chamber, and a support shaft disposed within the processing chamber to support the susceptor. The susceptor has a plurality of depressions formed in a lower surface thereof and the support shaft, as claimed, "has a main shaft positioned coaxial with a center of said susceptor, and a plurality of arms radially extending from an upper end of said main shaft, each of said arms having a distal end provided with a protrusion extending upward, said protrusions

correspondingly engaged in the associated depressions such that said protrusions can slide along said depressions only in a substantially radial direction of said susceptor."

Claims 15, 17, 18 and 20 depend from claim 14.

**Perlov** shows, in Figure 2(c), an underside of susceptor 36 with the susceptor support and drive cradle 50 superimposed thereon in broken lines. Susceptor 36 has a cavity 78, formed at its center, which receives a centering pin 54 of the susceptor support and drive cradle 50. The underside of susceptor 36 has "a pair of pockets 80 and an oval shaped cavity 82 formed therein", wherein "the pair of pockets receive two of the pins located at the ends of the support arms 56 of the support cradle 50 and the oval shaped cavity 82 receives the third such pin" (col. 4, lines 53-60). **Perlov** teaches that "*the pockets 80 are individually much larger in diameter than the outer diameter of the pins and serve only to provide a level support for the susceptor 36.*" (col. 4, lines 60-63)(emphasis added). The orientation of the susceptor is provided by (1) a combination of centering pin 54 located in cavity 78 and (2) a third pin 55 located, with a relatively small tolerance in the oval shaped cavity 82 (col. 4, lines 63-67).

Thus, **Perlov** shows a conventional susceptor, *as shown in the Background Art depicted in Figures 2-3 of Applicant's disclosure*, which respectively depict "a schematic perspective view showing a conventional wafer support" and "a bottom plan view of a conventional susceptor" (see, e.g., page 7, lines 11-17; page 1, line 11 to page 4, line 6).

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."

*Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). The

identical invention must be shown in as complete detail as is contained in the . . . claim.”

*Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989)(emphasis added).

Accordingly, **Perlov** does not anticipate any of claims 14, 15, 17, 18 or 20, as **Perlov** does not identically teach, as claimed, "a main shaft positioned coaxial with a center of said susceptor, and a plurality of arms radially extending from an upper end of said main shaft, each of said arms having a distal end provided with a protrusion extending upward, said protrusions correspondingly engaged in the associated depressions such that said protrusions can slide along said depressions only in a substantially radial direction of said susceptor."

The Examiner acknowledges that **Perlov** does not "specifically state that the pins can slide along the pockets 80 and cavity 82 only in a substantially radial direction of the susceptor, but such appears inherent in Perlov's apparatus in view of the constraints placed on the susceptor's movement by the center pin and the pin that is engaged in the elongated cavity".

To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the references, and that it would be so recognized by persons of ordinary skill". *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999)(emphasis added). As discussed below, not only has the Examiner failed to set forth evidence that the allegedly inherent feature is "necessarily present" in **Perlov**, but such allegedly inherent feature is necessarily absent from the teachings of **Perlov**, and would be so recognized by persons of ordinary skill in the art.

**Perlov's** pins (not numbered) which engage the depressions or pockets 80 cannot slide along the pocket 80 only in a substantially radial direction of the susceptor.

First, as noted above, pockets 80 are individually much larger in diameter than the outer diameter of the pins. Thus, the oversized pockets 80 cannot constrain sliding of the pins to sliding "only in a substantially radial direction of the susceptor", as claimed.

Second, the inside diameter of the depression or cavity 78 and the outside diameter of the centering pin 54 "are substantially identical to each other" (see, e.g., page 2, lines 21-24 of Applicant's disclosure). Thus, the configuration of the centering pin 54 of **Perlov** itself serves to prevent engagement of the remaining pins (see, e.g., pins 5d in Fig. 2 of Applicant's disclosure) in the associated depressions (i.e., 4c as shown in Fig. 2 of Applicant's disclosure) such that pins 5d "can slide along" the cavities in any direction, let alone "only in a substantially radial direction", as claimed. The tight fit between the centering pin 54 and the cavity 78, as intended, fixes the position of the susceptor relative to the support and does not permit sliding (in any direction) of pins relative to pockets 80.

Again, it is noted that claim 14 requires "a main shaft . . . and a plurality of arms radially extending from an upper end of said main shaft, *each* of said arms having . . . *a protrusion* extending upward, said *protrusions* correspondingly engaged in the associated *depressions* such that said *protrusions* can slide along said *depressions* only in a substantially radial direction of said susceptor." **Perlov's** teaching of a single cavity that permits sliding of a single pin only in a substantially radial direction is legally insufficient to anticipate the claimed invention.

Still further, it is submitted that **Perlov** does not identically teach, as claimed, that the "susceptor is supported only by said protrusions provided on said distal end of each of said arms". Instead, **Perlov** clearly requires the susceptor to be supported by centering pin 54 in cavity 78, as well as the other pins provided in pockets 80 and 82.



Is submitted, for at least the reasons presented above, that **Perlov** does not anticipate claims 14, 15, 17, 18 or 20 under 35 U.S.C. § 102(a). Reconsideration and withdrawal of this rejection is requested.

**THE 35 U.S.C. § 103 REJECTION OF CLAIMS 14, 15, 17, 18 AND 20 OVER**

**PERLOV**

Claims 14, 15, 17, 18 and 20 were rejected under 35 U.S.C. § 103(a) as being obvious over **Perlov**. Reconsideration is requested.

The Examiner alleged that **Perlov** (Figs. 2a and 2c) discloses a semiconductor processing apparatus including a susceptor having a plurality of pockets 80 and cavities 78, 82 formed in its lower surface, and a main support shaft having a plurality of arms radially extending from an upper end of the main support shaft, wherein each arm has a pin extending upwardly to engage a corresponding pocket or cavity. **Perlov** is noted to have one cavity having an elongated form extending radially, but is acknowledged not to "specifically state that the pins can slide along the pockets 80 and cavity 82 only in a substantially radial direction of the susceptor". The Examiner relies upon the theory of inherency to supply such teaching or suggestion, arguing that such element appears inherent in **Perlov** "in view of the constraints placed on the susceptor's movement by the center pin and the pin that is engaged in the elongated cavity".

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art". *In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970); *see*

also *In re Ochiai*, 71 F.3d 1565, 1572 (Fed. Cir. 1995)(stating “[w]hen evaluating the scope of a claim, every limitation in the claim must be considered”). For the reasons presented above, omitted herein for brevity, it is submitted that **Perlov** does not teach each and every element of the claimed invention.

It is further submitted that the claimed invention is not suggested by **Perlov**, for the reasons provided below.

The requisite motivation to support the ultimate legal conclusion of obviousness under 35 U.S.C. §103 is not an abstract concept, but must stem from the applied prior art as a whole and must have realistically impelled one having ordinary skill in the art to modify a specific reference in a specific manner to arrive at a specifically-claimed invention. *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989).

The case law has cautioned against focusing on the obviousness of the *differences* between the claimed invention and the prior art rather than on the obviousness of *the claimed invention as a whole*, as § 103 and *Graham v. Deere* require. See, e.g., *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 231 USPQ 81, 93 (Fed. Cir. 1986). As stated in MPEP § 2141.02, “the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious” (citing *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530 (Fed. Cir. 1983) (emphasis in original)).

The legal concept of *prima facie* obviousness is a procedural tool of patent examination, allocating the burdens of going forward with production of evidence in each step of the examination process (*citations omitted*)(see, e.g., MPEP § 2142). The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness.

If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness. In view of all of the factual information, the examiner must make a determination as to whether the claimed invention "as a whole" would have been obvious at the time of invention to one of ordinary skill in the art (the Applicant's specification itself being unknown to that skilled person).

The claimed invention provides, as a whole, a semiconductor production apparatus comprising a processing chamber, a susceptor disposed within the processing chamber, and a support shaft disposed within the processing chamber to support the susceptor, wherein the susceptor has a plurality of depressions formed in a lower surface thereof and the support shaft "has a main shaft positioned coaxial with a center of said susceptor, and a plurality of arms radially extending from an upper end of said main shaft, each of said arms having a distal end provided with a protrusion extending upward, said protrusions correspondingly engaged in the associated depressions such that said protrusions can slide along said depressions only in a substantially radial direction of said susceptor." In the claimed invention, with reference to the embodiment depicted in Figures 5 and 6, each of the support shaft (e.g., 26) arms (e.g., 28) having a distal end provided with a protrusion (e.g., 30) extending upward, the protrusions correspondingly engaged in the associated depressions (e.g., 32) such that the protrusions can slide along the depressions only in a substantially radial direction of the susceptor. Claim 14 further requires that the "susceptor is supported only by said protrusions provided on said distal end of each of said arms".

However, the Examiner has not advanced a single argument as to why one skilled in the art would be motivated to modify **Perlov's** apparatus to arrive at the claimed

invention. No evidence is presented as to what specific modifications are suggested by **Perlov** or why one skilled in the art would be motivated to make such modifications (the Applicant's specification itself being unknown to that skilled person). The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness. It is submitted that the examiner has not advanced a legally sufficient *prima facie* case as to whether or why the claimed invention "as a whole" would have been obvious at the time of invention to one of ordinary skill in the art absent the benefit of Applicant's specification.

In fact, the only teaching of the claimed combination of susceptor depressions and main shaft arm protrusions appears to lie within the Applicants' disclosure. Any reliance on the Applicants' disclosure to support the rejection is improper. "It is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious." *In re Fritch*, 23 USPQ2d 1780 (Fed. Cir. 1992) (*see also In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991) *stating* "The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on the applicant's disclosure.").

Withdrawal of this rejection and allowance of claims 14, 15, 17, 18 and 20 is requested for at least the above reasons. "If examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of the patent." *In re Oetiker* 24 USPQ2d 1443, 1444 (Fed. Cir. 1992)(*citations omitted*).

**THE 35 U.S.C. § 103 REJECTION OF CLAIM 19 OVER PERLOV**

Claim 19 was rejected under 35 U.S.C. § 103(a) as being obvious over **Perlov**.

Reconsideration is requested.

Patentability of claim 19 is premised upon claim 14, from which claim 19 depends, and is asserted to be patentable over **Perlov** for at least the reasons asserted above with respect to claim 14.

The Examiner alleges that, "while Perlov describes round pockets 80 for his susceptor support pins, other shapes would have been prima facie obvious to one skilled in the art as long as they avoided the abrasion as desired by Perlov (col. 5, lines 1-4)."

This argument ignores the fact that **Perlov** has purportedly solved the very problem of abrasion by providing, in combination, oversized pockets 80 to receive support pins, a centering pin 54 and cavity 78 configured to center the susceptor, and a third pin 55 slidably disposed in an oval cavity 82. Where is the motivation to experiment with this configuration to again solve the same problem solved by **Perlov**?

Even if one skilled in the art were motivated to configure the pockets in another shape, such as a square, **Perlov** teaches that these pockets are configured so as to be "*individually much larger in diameter than the outer diameter of the pins*". There is no teaching or suggestion that such pockets and pins be configured to correspondingly engage one another "such that said protrusions can slide along said depressions only in a substantially radial direction of said susceptor" or that "each of said depressions has an elongated form extending in said radial direction", as claimed.

In fact, **Perlov's** express election of the oversized pockets 80 in spite of Perlov's recognition of the benefit of one depression of elongated form 82 extending in the radial direction is evidence of the non-obviousness of the claimed invention.

In view of the above, one skilled in the art would be no more motivated than **Perlov** to deviate from the teachings of **Perlov** to arrive at the claimed invention.

Although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so." See *In re Fritch*, 972 F.2d 1260 (Fed. Cir. 1992). The Examiner must show reasons why a skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed. *In re Rouffet*, 149 F.3d 1350, 47 USPQ2d 1453 (Fed. Cir. 1998). The showing must be clear and particular. See, e.g., *In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999); *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1352 (Fed. Cir. 1998).

It is submitted that the Examiner's burden to set forth a *prima facie* case of obviousness has not been discharged. The Examiner's allegation that it would have been obvious to modify **Perlov's** apparatus to arrive at the claimed invention is not deemed credible as the Examiner asserts that one skilled in the art, having the knowledge available to **Perlov**, would somehow arrive at a different result (i.e., the claimed invention) than **Perlov** to solve the same problem solved by **Perlov**.

Moreover, it is submitted that the Examiner's allegations are in error as **Perlov** appears to teach away from such modification. **Perlov** takes pains to ensure that the pockets 80 are oversized to avoid any contact of the pins with the walls of the pocket.

Claim 19 requires that "each of said depressions has an elongated form extending in said radial direction" and the protrusions "can slide along said depressions only in a substantially radial direction of said susceptor". Therefore, the generous clearances of **Perlov** are absent from the present invention. According to the teachings of **Perlov**, such configuration could present additional risk of abrasion of the susceptor and generation of unwanted particles (see, e.g., col. 5, lines 1-4). Thus, absent some compelling evidence to the contrary, arrived upon without the benefit of Applicants' disclosure, it is submitted that one skilled in the art would not have been motivated by **Perlov** to modify the apparatus therein to arrive at the claimed invention.

Reconsideration and withdrawal of this 35 U.S.C. § 103 rejection is requested for at least the above reasons.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned VERSION WITH MARKINGS TO SHOW CHANGES MADE.

09/807,902

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE CLAIMS**

The claims are amended as follows:

1. A semiconductor production apparatus including a process chamber; a wafer support disposed within said process chamber for supporting a semiconductor wafer; and a heating source for heat treatment of the semiconductor wafer supported by said wafer support;

wherein said wafer support comprises a susceptor having an upper surface for mounting said semiconductor wafer thereon, and a susceptor support shaft for supporting said susceptor from thereunder; wherein said susceptor support shaft having a main shaft positioned substantially coaxial with a center of said susceptor, and at least three arms radially extending from an upper end of said main shaft, each said arm having a distal end provided with a protrusion directed toward said susceptor; wherein a peripheral portion of a lower surface of said susceptor being formed with depressions, each said depression having an inside diameter substantially identical to an outside diameter of said protrusion, adapted to engage said protrusion, wherein each of said depressions extend in a radial direction of said susceptor, and wherein a [bottom] portion of each of said depressions extends along a direction substantially parallel to a plane defined by at least one of a top surface of said susceptor or a bottom surface of said susceptor so as to permit movement of said susceptor in a substantially radial direction relative to said protrusions along said depressions.

3. A semiconductor production apparatus according to claim 1, wherein said [depression has] depressions have an elongated form extending in a radial direction of said susceptor.

14. A semiconductor production apparatus comprising:

a processing chamber;

a susceptor disposed within said process chamber and having an upper surface for mounting a semiconductor wafer thereon;

a support shaft disposed within said process chamber for supporting said susceptor; and

a heating source disposed so as to heat the wafer mounted on said susceptor,

wherein said susceptor has a plurality of depressions formed in a lower surface thereof;

wherein said support shaft has a main shaft positioned coaxial with a center of said susceptor, and a plurality of arms radially extending from an upper end of said main shaft, each of said arms having a distal end provided with a protrusion extending upward, said protrusions correspondingly engaged in the associated depressions such that said protrusions can slide along said depressions only in a substantially radial direction of said susceptor, and

wherein said susceptor is supported only by said protrusions provided on said distal end of each of said arms.

16. A semiconductor production apparatus according to claim 15, wherein said protrusions are engaged in said [depression] depressions on the outermost peripheral side thereof, respectively, at ambient temperature.